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(54) Name of the invention:

Electrostatic Adhesion (Adsorption) Body

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(54) [Name of the Invention]

Electrostatic Adhesion Body

(57) [Abstract]

[Objective]

The goal of the present invention is to suggest electrostatic adhesion body, which can adhere on different types of materials and also, which is capable of holding paper, film, etc., materials subject to adhesion, and especially, the present invention is about electrostatic adhesion body, which together with that also has recording properties.

[Structure]

The body has a structure that is formed from a porous material film or sheet 1, which is comprised of electrostatically chargeable polymer material. Also, it is formed from a recording layer 4, which is layer laminated on the surface of this electrostatically chargeable polymer layer 1. Especially, this body is formed from the supporting body 2, the porous layer 1, which is formed by electrostatically chargeable polymer laminated on one side of the supporting body, and the recording layer 4, which is layer laminated on the other side of the supporting body.

[Results]

Through a porous layer formed from electrostatically chargeable polymer an electrostatic adhesion body with excellent frictional charging properties is obtained, and a recording layer is layer laminated on this electrostatic adhesion body, and this is directly printing and can be used in signs, etc.,

and because of the fact that a recording layer is laminated with a supporting material in between, its strength is also excellent.

[Scope of the Claims]

[Claim 1]

Electrostatic adhesion body, characterized by the fact that it is a body formed from a porous material film or sheet, which is comprised of electrostatically chargeable polymer material.

[Claim 2]

Electrostatic adhesion body characterized by the fact that it is a body formed from a porous material film or sheet, which is comprised of electrostatically chargeable polymer material and a recording layer, which is layer laminated on the surface of the above porous layer.

[Claim 3]

Electrostatic adhesion body characterized by the fact that it is a body formed from a supporting body, a porous layer, which is formed by electrostatically chargeable polymer and is laminated on one side of the supporting body, and a recording layer, which is layer laminated on the other side of the supporting body.

[Detailed Description of the Invention]

[0001]

[Technological Sphere of Application]

The present invention is an invention about an electrostatic adhesion body, and especially, the present invention is about an electrostatic adhesion body which utilizes the electrostatic adsorption force, and it can adhere on the surface of walls and different types of products, and by that it can hold different materials subject to adhesion, or when it is also equipped with recording properties, it can be adhered on the surface of different types of products.

[0002]

[Prior Art]

In the past, for the adhesion of paper, film, etc., on wall surfaces, wind surfaces, bulletin boards, lockers, desks, shelves, etc., items, usually, adhesive agents, adhesive tape, magnets etc., have been used. Relative to that, synthetic resin films have been suggested whereby the utilization of the electrostatic adhesion force is used, and the adhesion to different types of items has become possible. For example, the polyvinyl chloride film where organic ketone with a number of carbon atoms in the range of 40 ~ 60, has been compounded, and by that a lasting electrostatic adhesion force has been imparted (Japanese Patent Application Number Showa 58-98351), the polypropylene type film where a layer is formed from a composition consisting of propylene type resin and a modified propylene type resin (Japanese Patent Application Number Showa 61-251), etc., have been suggested.

[0003]

In the case of these synthetic resin films, lasting electrostatic adhesion properties are imparted, and because of that there is no use of adhesive agent or magnets and the repeated adhesion on different material is possible, and also, the change of the adhesion location is easy, and not only that, but also, there is no soiling of the adhesion surface. However, such synthetic resin films become substitutes for the adhesive agents or the adhesive tapes etc., however, they themselves do not have recording feasibility properties, and because of that in the case of posters etc., materials subject to adhesion, it is necessary that such synthetic resin film is adhered on the predetermined material and then the poster etc., is adhered the top of that. Also, in the case of these synthetic resin films according to the previous technology, in order to impart lasting electrostatic adhesion force it is necessary to compound specific materials, and there has been the problem that if these are immersed in warm water with a temperature exceeding 30oC, there have been cases where a water resistant whitening phenomenon is generated, etc.

[0004]

Also, as the surface layer of material holding device, which consists of insulating material, electrode grouping and a sheet used for surface

adhesion, the use of plastic sheet, which has thermoplastic resin and synthetic rubber as its main components, and which has a bulk specific resistance value that is within a specific range, has been suggested (disclosed in the description of the Japanese Patent Application Number Showa 55-20830). If such plastic sheet with a material holding capability is used, an static electricity is generated on the sheet used for the adhesion by passing a high voltage electrical current to the electrode, and through this static electricity it is possible to hold paper, film, foil, etc. However, in the case of this material holding device, there have been the problems that the manufacture of the electrodes is difficult, and an electrical source is necessary, and it cannot be used in portable applications, etc.

[0005]

In order to solve these problems, as it is shown according to the presented in Figure 2, the authors of the present patent application have suggested the electrostatic adhesion body 30, which is formed as the microporous or porous layer 10,which consists of electrostatically chargeable polymer, is formed on the surface of the supporting body 20 (disclosed in the description of the Japanese Patent Application Number Hei-Sei 4-262823).

[0006]

[Problems Solved by the Present Invention]

The suggested electrostatic adhesion body 30, which is formed as the microporous or porous layer 10,which consists of electrostatically chargeable polymer, is formed on the surface of the supporting body 20, has electrostatic adhesion force, and it can be adhered onto different types of materials, or it is an excellent material used as an electrostatically adhered material that is capable of holding different types of materials subject to adhesion. However, the technological processes where the electrostatically chargeable polymer is dissolved in solvent, and it is coated on a metal plate, ceramic plate, paper, plastic film, etc., substrate materials 20, and is dried, are required, and these substrate materials, are also required.

[0007]

Also, it is desirable that the suggested by the authors of the present invention electrostatic adhesion body 30, which is formed as the microporous or

porous layer 10,which consists of electrostatically chargeable polymer, is formed on the surface of the supporting body 20, itself is provided with recording properties.

[0008]

[Objective]

The present invention has taken into consideration the described about various points, and it has as an objective to suggest electrostatic adhesion body, which has an electrostatic adhesion force and which can adhere on different types of materials, or, which is capable of holding paper, film, etc., materials subject to adhesion. Also, the present invention has as an objective to suggest electrostatic adhesion body, which is equipped with recording properties.

[0009]

[Measures to Solve the Problems]

In order to achieve these objectives, the electrostatic material according to the present invention has a structure that is formed from a porous material film or sheet, which is comprised of electrostatically chargeable polymer material. Also, the electrostatic material according to the present invention has a structure that is formed from a porous material film or sheet, which is comprised of electrostatically chargeable polymer material and from a recording layer, which is layer laminated on the surface of this porous layer. Especially, the electrostatic material according to the present invention has a structure is formed from the supporting body, the porous layer, which is formed from electrostatically chargeable polymer laminated on one side of the supporting body, and the recording layer, which is layer laminated on the other side of the supporting body.

[0010]

Here below the present invention will be explained in further details. Regarding the electrostatic adhesion body according to the present invention, as it is shown in Figure 1 (a), it is a film or a sheet, which is a film formed from a porous layer 1 comprised of electrostatically chargeable polymer, and as it is shown according to Figure 1 (b), it is a film or a sheet,

where on a film formed from a porous layer 1 comprised of electrostatically chargeable polymer, the recording layer 4, has been layer laminated. Especially, as it is shown according to Figure 1 (c), it is a film or a sheet where on one side of the supporting body 2, the porous layer 1 comprised of electrostatically chargeable polymer, is layer laminated, and on the other side of the supporting body 2, the recording layer 4 is layer laminated.

[0011]

There are no specific limitations regarding the electrostatically chargeable polymers used according to the present invention, however, as more detailed examples, it is possible to list the following materials: acrylic resin, vinyl chloride – vinyl acetate resin, vinyl chloride – vinyl acetate – maleic acid resin, styrene – acrylic resin, acrylic – vinyl chloride resin, unsaturated polyesters, chlorinated rubbers, vinyl acetate resins, cellulose acetate resins, ethyl cellulose resins, phenol resins, acrylonitrile – vinylidene chloride resins, etc.

[0012]

There are no specific limitations regarding the recording layer 4 used according to the present invention, however, (1) recording layer with ink jet recording suitability properties, (2) recording layer with suitability properties for dye sublimation through one type of thermal transfer recording, etc., are preferred.

Regarding the (1) recording layer with ink jet recording suitability properties, it is a layer which fixes and holds the ink recorded from the side of the recording layer, and especially, it is preferred if it is a layer, which has excellent ink absorbing properties and ink color development properties relative to water – alcohol type inks or water soluble inks. As resins forming such recording layer, for example, it is possible to list polyamide, polyacrylamide, polyvinyl pyrolidone, polyethylene imine, polyvinyl pyridinium halide, melamine resins, polyurethanes, carboxy methyl cellulose, hydroxy ethyl cellulose, hydroxy methyl cellulose, polyvinyl alcohol, polyester, sodium polyacrylate etc., hydrophilic synthetic polymers, or gelatin, starch, cellulose, casein, chitin, chitosan, etc., hydrophilic natural polymers, polyethylene oxide or its copolymer materials, etc., high water adsorbing resins. Also, it is a good option if lipophilic resins, such as (meth)acrylic acid ester copolymers, are appropriately compounded. By that

it is possible to improve the performance that is required of the paper used for ink jet recording, such as for example, the ink absorption properties, the water resistance properties, the weather resistance properties etc.

[0013]

Also, as the solvent agent, it is possible to use water, alcohols, esters, ketones, etc. Especially, for the recording layer, it is also a good option if a matting agent is added into the resin material. As such matting agent, it is possible to use silica (amorphous silica), clay, talc, diatomaceous earths, calcium carbonate, calcium sulfate, barium sulfate, aluminum silicate, titanium oxide, zinc oxide, synthetic zeolites, alumina, etc., well known matting agents, and besides those it is also a good option to use smectites. And it is possible to use these matting agents individually, and it is also a good option if two or more types of them are mixed and used. Regarding the amount added of this matting agent, usually, it is within the range of 5 ~ 200 weight parts relative to 100 weight parts of the resin material. If the added amount exceeds 200 weight parts, it is not preferred because the binding ability of the resin is lost. In the recording layer it is also possible to add besides the matting agent, a leveling agent, a ultra-violet light absorbing agent, an anti-oxidation agent, etc., additive agents.

[0014]

Regarding the (2) recording layer which has thermal melt transfer recording suitability properties, it is a layer which has wear (friction) resistance properties, and which transfers the ink jet onto the front surface, and because of that it is preferred to be a layer with a good smoothness in order to have good adhesion properties with the heat generating body of the printer and with the ink ribbon. As the resin, which forms the recording layer that has properties suitable for such thermal melting transfer recording, for example, it is possible to use styrene-butadiene rubber (SBR), vinyl acetate resin, acrylic resin, etc., and it is preferred that the Beck smoothness is at least 50 seconds or higher. As the solvent agent, it is possible to use ketone, toluene, cyclohexanone, alcohol, etc.

[0015]

Regarding the (3) recording layer with dye sublimation recording suitability properties, it is preferred to be a layer with such surface chemical properties

and physical structure that it is easily dyed by the sublimation properties possessing dye. As the resin material, which forms the recording layer possessing such dye sublimation recording suitability properties, for example, it is possible to list polyester resins, polyvinyl butyral resins, polyurethane resins, etc. and depending on the requirements, it is possible to add metal complex compounds, which contain polyvalent metal ions that are used for chelating, mold release agents, for example, silicone resins, silicone oil, fluorinated resins, etc. As solvents it is possible to use ketones, acetone, toluene, cyclohexanone, etc.

[0016]

There are no specific limitations regarding the supporting material 2, which is used according to the present invention, and metal plates, ceramic plates, paper, plastic films, etc., are appropriate. The electrostatic adhesion body 32 shown according to Figure 1 ©, where the porous layer 1, comprised of electrostatically chargeable polymer, is formed on one side of the supporting body 2, and on the other side of the supporting body 2, the recording layer 4, has been formed, can be manufactured according to the described here below.

[0017]

The above described electrostatically chargeable polymer material is dissolved in a solvent, and it is coated on one side of a supporting body 2 selected from the above described materials, and then dried. As the solvent agent during the formation of the porous layer a combination of a good solvent and a poor solvent relative to the polymer, is used. By varying the ratio of the good solvent and the poor solvent, it is possible to vary the pore diameter. Regarding the porous layer, it is possible to produce the so-called microporous membrane, which is a coated layer that has open pores at the surface of the film, where contiguous air bubbles or partially contiguous air bubbles are formed in the layer thickness direction, and it is a coated layer which has fine pores with a diameter of approximately 5 microns or less. Also, it is a good option if it is a coated membrane, which has coarse open pores with a diameter approximately in the range of 5 ~ 100 microns, the so-called brushing membrane. Regarding the brushing membrane, it is possible to be formed as after the coating of the polymer solution, it is dried in ambient atmosphere with a humidity in the range of 60 ~ 80 %, and usually,

the surface layer air bubbles become contiguous air bubbles after approximately 5 seconds.

[0018]

By making the layer comprised of the electrostatically chargeable polymer material into a brushing membrane or a microporous membrane, the results from the electrostatic properties are significantly improved compared to the case when it is made into the smooth surface homogeneous membrane according to the previous technology. From the point of view of the triboelectric charging, the microporous membrane is especially preferred. Especially, for the layer lamination of a recording layer 4 on the other side of the supporting body 2, for example, a recording layer which has ink jet recording suitability properties, the above described resin material individually or a material obtained by mixing such resins, and the required additive agents, are dissolved or dispersed in the appropriate solvent agent and the coating solution is thus prepared, and this is then coated on one side of the supporting body 2, by using the well known methods like the roll coating methods, the bar coating methods, the air knife coating method, the spray coating method, etc., and it is then dried. As the solvent agents, it is possible to use propylene glycol monomethyl ether, methylene glycol monomethyl ether, ethyl alcohol, methyl alcohol, isopropyl alcohol, etc., organic solvents or water.

[0019]

There are different methods for the preparation of the film or sheet from the layer 1, which is formed from electrostatically chargeable polymer, as it is shown according to the presented in Figure 1 (a), and for example, it can be formed as (1) on the surface of polyester, polycarbonate, etc., plastic films or synthetic paper, possessing die release properties relative to the electrostatically chargeable polymer (not shown in the figure), the solution of the electrostatically chargeable polymer is coated and dried, and a porous layer is formed, and after that the plastic film or the synthetic paper, are peeled off and removed. Also, it is a good option if it is formed as (2) a material obtained as a polymer used for the formation of well known foamed films, which is incompatible with the electrostatically chargeable polymer is added into the above electrostatically chargeable polymer, which becomes the mother material, and it is finely and homogeneously dispersed, and this material is then made into a sheet shape and it is elongated (oriented). As the

incompatible, well known polymer materials used for porous foam films, the high melting point polymers, that are selected from the group of poly – 3-methyl butene – 1, polystyrenes, polymethyl styrenes, etc., are used, and for example, polyolefins, especially, polymethyl pentene, are preferably used for polyester mother materials.

[0020]

Regarding the electrostatic adhesion body 31, such as that shown according to Figure 1 (b), where a recording layer 4 is formed on the surface of the porous layer 1 that is comprised of the electrostatically chargeable polymer material, it can be formed, for example, as in the case of the above described (1), where on the surface of polyester, polycarbonate, etc., plastic films or synthetic paper possessing die release properties relative to the electrostatically chargeable polymer (not shown in the figure), the solution of the electrostatically chargeable polymer is coated and dried, and a porous phase is formed, and then, after that on the surface of this porous phase, any of the above described recording suitability possessing recording layers 4, is provided, and then the plastic film or the synthetic paper, are peeled off and removed. Also, it is a good option if it is formed as on the surface of the formed according to the above (2) porous layer 1 that is comprised of the electrostatically chargeable polymer material, a coating solution used for the formation of any of the above described recording suitability properties possessing recording layers 4, is prepared, and it is then coated and dried. Moreover, the polymer of the layer 1 which is comprised of the electrostatically chargeable polymer material and the polymer, which forms the recording layer 4, are selected from mutually incompatible materials.

[0021]

There are no specific limitations regarding the thickness of the porous layer 1 that is comprised of the electrostatically chargeable polymer material, however, from the point of view of the mechanical strength relative to friction, and the resistance relative to repeated use, etc., usually, it is appropriate to be within the range from 25 microns to 250 microns. There are no specific limitations relative to the thickness of the supporting body 2, however, it is provided with thickness that is necessary as electrostatic adhesion body (for example, 6 ~ 188 microns), and also, in the case when the electrostatic adhesion body according to the present invention is adhered onto the body subject to adhesion, for example, in the case of an adhesion

onto the curved surface of an automobile front glass, a cylinder etc., it is preferred to use a thin plastic film etc., which has a flexible properties when used as a supporting material, and usually, the shape and the roughness of the surface of the body subject to the adhesion, are taken into consideration and a thickness is selected, which has flexibility that allows to impart bonding adhesive properties with the body subject to the adhesion.

[0022]

There are no specific limitations regarding the thickness of the recording layer 4, however, from the point of view of the mechanical strength relative to friction, the resistance when repeatedly used, etc., usually, it is within the range of 01. ~ 50 microns, and preferably, it is within the range of 1 ~ 20 microns. The electrostatic adhesion body 3 shown according to Figure 1 (a) has a capability as a double sided tape, which possesses excellent electrostatic adhesion force, and because of that, by only rubbing several times it can be bonded to a locker, window glass, wall etc., target body subject to the adhesion, and a memo paper, paper used for a message, advertisement, other paper forms, can be adhered at the desired position on the surface material of a bulletin board, a whiteboard etc., and also, it is possible to maintain the adhesion state for a prolonged period of time.

[0023]

Also, the electrostatic adhesion body according to the present invention can be used as a electrostatic holding device for different objects. In this case, the material that is the subject of the adhesion is usually, paper or plastic sheet, plastic film etc. For example, in the case when a paper, a tracing film, a cutting sheet, etc., medium is placed and held on the top of flat bed of automobile manufacturing design device, etc., platform, and different types of operations like drawing or cutting etc., are performed, if the electrostatic adhesion body according to the present invention is placed on the top of that platform, through the triboelectric charging, it is possible to easily hold this medium with a good flatness relative to the adhesion surface of the electrostatic adhesion body. The definition of the position of the used paper and the change of the position, are also easy, and because of that the edge part of the used paper is not raised and not only that but also, it is adhered to the flat bed and the flatness properties are also good, and because of that the operational properties of the production design are improved and a drawing with a good precision becomes possible.

[0024]

The triboelectric charge of the electrostatic adhesion layer (surface electric charge) varies with the object which is rubbed, however, it is preferred that it be + 0.9 kV or higher or – 0.9 kV or lower, and especially, it is preferred that it be + 1.1 kV or higher or – 1.1. kV or lower. By being within that range, by rubbing several times, it can be easily adhered on the surfaces of usual materials like glass, resin coated surfaces, and not only that, but also, it is possible to maintain the adhesive force for a prolonged period of time. In the case of the electrostatic adhesion body according to the present invention, the above described polymers are used and together with that the layer structure is made to be a porous type structure, and by that it is possible to obtain a large triboelectric charge in the case when it is rubbed with a PPC use paper, (copy use paper), tracing film, cutting sheets, etc.

[0025]

When the electrostatic adhesion body according to the present invention is adhere and held on the body subject to the adhesion through triboelectricity, the initial holding force increases with the passing of the time and it reaches a constant value. It is considered that this is due to the fact that the distance between the electrostatic adhesion body and the body subject to the adhesion becomes short and together with that it becomes homogeneous, and a condenser state is formed, and it becomes difficult for the electrical charge at the adhesion surface to escape. Consequently, in the case when the electrostatic adhesion body according to the present invention is used in applications where it is adhered on the front surfaces of flat items like walls, lockers etc., irrespective of the supporting material, there are no problems.

[0026]

The electrostatic adhesion body 31 shown according to Figure 1 (b) of the present invention, and the electrostatic adhesion body (32) according to the present invention, which is shown according to Figure 1 (c) where the supporting body 4 is present, have excellent electrostatic adhesion force, and together with that because the recording layer 4 is provided, it is possible to make a record on this recording layer 4 in advance and after that easily adhered it on the target body subject of the adhesion, or, it is also possible to conduct the adhesion and after that make a record on the recording layer 4,

and also, it is possible to maintain a good adhesion state relative to the body subject to the adhesion for a prolonged period of time.

[0027]

[Practical Examples]

Here below, the practical examples according to the present invention will be explained.

[Practical Example 1]

On the surface of a polyester film (Q81, manufactured by Toray Company), the described below coating solution used for the porous layer, is coated by using a Meyer bar, and by using a drying device it is dried at a temperature of 60oC for a period of 5 minutes, and at a layer thickness of 30 microns, a porous layer was formed, which has open pores with an average size of 2 microns. After that, the polyester film was peeled off from the obtained coated film, and the electrostatic adhesion body according to the present invention, was obtained.

[0028]

The electrostatic adhesion body according to the present invention was placed on a glass window, a wall (a rough surface where paint has been sprayed) and on the side surface of a refrigerator, and it was adhered correspondingly by rubbing several times, and after that, copied PPC use paper, poster etc., are rubber several times on the electrostatic adhesion bodies and they are adhered and left to stand. As a result from that, even after the passage of a period of 6 months, the electrostatic adhesion body was adhered on the surface subject to the adhesion and also, the copied PPC use paper, poster etc., had not fallen off.

[0029]

Porous Layer Coating Solution

Nitrocellulose (HIG1/1: Asahi Chemical Industry Co. Ltd.)	10 weight parts

Acetone	67.5 weight parts
Methylethyl ketone	22.5 weight parts

[Practical Example 2]

On the surface of a polyester film (Q81, manufactured by Toray Company), the same coating solution used for the porous layer as that according to the above Practical Example 1, is coated by using a Meyer bar, and by using a drying device it is dried at a temperature of 60oC for a period of 5 minutes, and at a layer thickness of 8 microns, a porous layer was formed, which has open pores with an average size of 2 microns. The surface of the porous layer of the obtained coated film was placed so that it was facing an automobile front glass, and it was adhered by rubbing several times, and after that, the only the polyester film was removed, and the electrostatic adhesion body according to the present invention was formed on the front glass. As a result from that, even after the passage of a period of 1 month, the electrostatic adhesion body had not fallen off. Also, because of the fact that a thin electrostatic adhesion body was used, it was possible to have that body conform and adhere even on the curved surface.

[0030]

[Practical Example 3]

On one side of a 75 micron thick polyester film, the described here below coating solution used for the porous layer, was coated, and by using a drying equipment where the humidity was maintained at 80 %, it was dried at a temperature of 60oC for a period of 10 minutes, and a brushing porous layer was formed where the air bubble diameter was approximately 30 microns. Especially, on the surface of this layer, the described below coating solution used for the formation of the recording layer, was coated by using a bar coater, and a recording layer with a dry layer thickness of 10 microns, was formed. A printing was performed on the recording layer surface of the obtained recording material by using an ink jet printer and after that the polyester film was peeled off, and the electrostatic adhesion body according to the present invention was obtained.

[0031]

The electrostatic adhesion body was placed on a glass window, a wall (a rough surface where paint has been sprayed) and on the side surface of a refrigerator, and it was adhered correspondingly by rubbing several times. As a result from that, even after the passage of a period of 6 months it was adhered to the surface subject to the adhesion.

Porous Layer Coating Solution

Styrene – Acrylic resin (EMU powder: manufactured by BASF Company)	5 weight parts
Acetone	45 weight parts
Ethanol	50 weight parts

Recording Layer Coating Solution

PVP (PVPK-90; manufactured by ISP Company)	3 weight parts
(meth)acrylic acid ester copolymer	2 weight parts
Methyl cellosolve	45 weight parts

[Practical Example 4]

On one side of a 75 micron thick polyester film, the same way as in the case of the Practical Example 3 described above, a brushing porous layer was formed where the air bubble diameter was approximately 30 microns. Especially, on the surface of this layer, the described below coating solution used for the formation of the recording layer, was coated by using a bar coater, and a recording layer with a dry layer thickness of 5 microns, was formed. A printing was performed on the recording layer surface of the obtained recording material by using sublimation transfer printer and after that the polyester film was peeled off, and the electrostatic adhesion body according to the present invention was obtained.

[0032]

This electrostatic adhesion body was placed on a glass window, a wall (a rough surface where paint has been sprayed) and on the side surface of a

refrigerator, and it was adhered correspondingly by rubbing several times. As a result from that, even after the passage of a period of 6 months it was adhered to the surface subject to the adhesion.

Recording Layer Coating Solution

Vinyl acetate resin (Gosenil PV-500: manufactured by Nippon Gosei Chemical Industry Co. Ltd.)	10 weight parts
Toluene	40 weight parts

[Practical Example 5]

On one side of a 75 micron thick polyester film, the same way as in the case of the Practical Example 3 described above, a brushing porous layer was formed where the air bubble diameter was approximately 30 microns. Especially, on the surface of this layer, the described below coating solution used for the formation of the recording layer, was coated by using a bar coater, and a recording layer with a dry layer thickness of 10 microns, was formed. A printing was performed on the recording layer surface of the obtained recording material by using a thermal melting transfer printer and after that the polyester film was peeled off, and the electrostatic adhesion body according to the present invention was obtained.

[0033]

This electrostatic adhesion body was placed on a glass window, a wall (a rough surface where paint has been sprayed) and on the side surface of a refrigerator, and it was adhered correspondingly by rubbing several times. As a result from that, even after the passage of a period of 6 months it was adhered to the surface subject to the adhesion.

Recording Layer Coating Solution

Unsaturated polyester resin (Vylon 200: manufactured by Toyobo Co. Ltd.)	10 weight parts
Methyl ethyl ketone	30 weight parts

Toluene	30 weight parts
Cyclohexanone	30 weight parts

[Practical Example 6]

On one side of a 75 micron thick polyester film the described here below coating solution used for the recording layer was coated by using a bar coater, and dried so that the layer thickness became 10 microns. On the side opposite of that recording layer, the described below coating solution used for the porous layer was coated by using a Meyer bar and after that, by using a drying device it is dried at a temperature of 60oC for a period of 5 minutes, and at a layer thickness of 8 microns, a porous layer was formed, which has open pores with an average size of 0.8 microns and the electrostatic adhesion body according to the present invention was obtained.

[0034]

On the recording layer surface of the electrostatic adhesion body according to the present invention printing was performed by using an ink jet printer, and after that the porous layer side was placed so that it was facing a glass window, a wall (a rough surface where paint has been sprayed) and on the side surface of a refrigerator, and it was adhered correspondingly by rubbing several times. As a result from that, even after the passage of a period of 6 months it was adhered to the surface subject to the adhesion.

Recording Layer Coating Solution

PVP (PVPK-90: manufactured by ISP Company)	3 weight parts
(Meth)acrylic acid ester copolymer	2 weight parts
Methyl cellosolve	45 weight parts

Porous Layer Coating Solution

Vinyl chloride – vinyl acetate resin (400 x 150S: manufactured by Nippon Zeon Company)	10 weight parts

Methyl Ethyl Ketone 65 weight parts

N-butanol 25 weight parts

[Practical Example 7]

On one surface of a 50 micron thickness polyester film, the described below coating solution used for the recording layer was coated using a bar coater and dried so that the layer thickness became 5 microns, and the recording layer was formed. Especially, on the surface opposite to this recording layer, the same porous layer was formed as that according to the Practical Example 6, and the electrostatic adhesion body according to the present invention was obtained.

[0035]

On the recording layer surface of the electrostatic adhesion body according to the present invention printing was performed by using a thermal melting transfer printer, and after that the porous layer side was placed so that it was facing a glass window, a wall (a rough surface where paint has been sprayed) and on the side surface of a refrigerator, and it was adhered correspondingly by rubbing several times. As a result from that, even after the passage of a period of 6 months it was adhered to the surface subject to the adhesion.

Recording Layer Coating Solution

Vinyl acetate resin 10 weight parts
(Gosenil PV-500: manufactured by Nippon Gosei Chemical Industry Co. Ltd.)

Toluene 40 weight parts

[Practical Example 8]

On one surface of a 100 micron thickness polyester film, the described below coating solution used for the recording layer was coated using a bar coater and dried so that the layer thickness became 10 microns, and the recording layer was formed. Especially, on the surface opposite to this recording layer, the same porous layer was formed as that according to the

Practical Example 6, and the electrostatic adhesion body according to the present invention was obtained.

[0036]

On the recording layer surface of the electrostatic adhesion body according to the present invention printing was performed by using a sublimation transfer printer, and after that the porous layer side was placed so that it was facing a glass window, a wall (a rough surface where paint has been sprayed) and on the side surface of a refrigerator, and it was adhered correspondingly by rubbing several times. As a result from that, even after the passage of a period of 6 months it was adhered to the surface subject to the adhesion.

Recording Layer Coating Solution

Unsaturated polyester resin (Vylon 200: manufactured by Toyobo Co. Ltd.)	10 weight parts
Methyl ethyl ketone	30 weight parts
Toluene	30 weight parts
Cyclohexanone	30 weight parts

As it is clear from the above described Practical Examples, the electrostatic adhesion body according to the present invention, which contains a brushing membrane or a microporous membrane as the electrostatic adhesion body, shows excellent frictional charging properties and together with that it is equipped with a recording layer, and because of that, it is appropriate for gluing and posting of printed materials.

[0037]

[Results From the Present Invention]

As it is also clear from the practical examples described here above, according to the present invention an electrostatic adhesion body is suggested, which through the formation of a porous layer that is comprised of an electrostatically chargeable polymer, possesses excellent electrostatic

charging capability properties. On the electrostatic adhesion body according to the present invention a recording layer is layer laminated and because of that it is possible that the electrostatic adhesion body according to the present invention be subjected to direct printing and be used for posting etc., applications. Especially, because of the fact that in the case of the electrostatic adhesion body according to the present invention the recording layer is layer laminated with the presence of a supporting layer in between, it is also possible to obtain an electrostatic adhesion body, which has also excellent strength.

[Brief Explanation of the Figures]

[Figure 1]

Figure 1, (a), (b), and (c), are all sectional view diagrams of the electrostatic adhesion body according to the present invention.

[Figure 2]

Figure 2 represents a sectional view diagram of an electrostatic adhesion body according to the previous technology.

[Explanation of the Symbols]

1.....electrostatically chargeable polymer layer
2.....supporting body
3, 31, 32..... Electrostatic adhesion body
4.....recording layer

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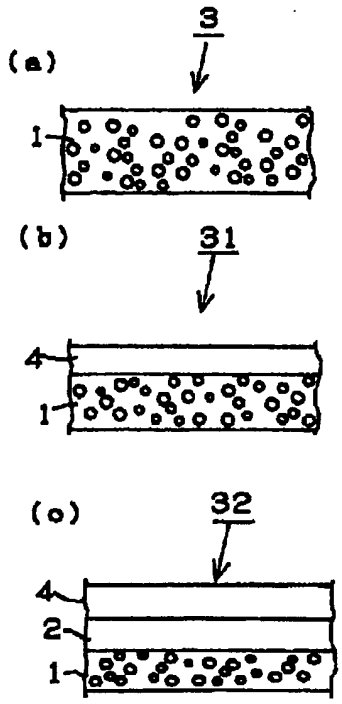
(54)【発明の名称】　静電吸着体

(57)【要約】

【目的】　各種物品に付着可能、かつ、紙やフィルム等の被着体の保持可能な静電吸着体を提供すること、更に、記録性を兼ね備えた静電吸着体を提供する。

【構成】　静電荷帯電可能なポリマーからなる多孔質のフィルムまたはシート１から成る。また、この静電荷帯電可能なポリマー層１の上に積層された記録層４とから成る。更に、支持体２と、支持体の一方に積層された静電荷帯電可能なポリマーからなる多孔質の層１と、支持体の他方に積層された記録層４とから成る。

【効果】　静電荷帯電可能なポリマーからなる多孔質の層により、優れた摩擦帯電特性を有する静電吸着体が得られ、この静電吸着体には記録層が積層されているので、直接印刷して掲示等に使用でき、支持体を介して記録層が積層されているので、強度的にも優れている。



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【特許請求の範囲】

【請求項1】静電荷帯電可能なポリマーからなる多孔質のフィルムまたはシートから成ることを特徴とする静電吸着体。

【請求項2】静電荷帯電可能なポリマーからなる多孔質の層と、前記多孔質の層上に積層された記録層とから成ることを特徴とする静電吸着体。

【請求項3】支持体と、前記支持体の一方に積層された静電荷帯電可能なポリマーからなる多孔質の層と、前記支持体の他方に積層された記録層とから成ることを特徴とする静電吸着体。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は静電吸着体に係わり、特に静電気の吸着力を利用し、壁や各種物品の表面に付着可能で各種被着体を保持可能な、あるいは記録性を備え壁や各種物品の表面に付着可能な静電吸着体に関する。

【0002】

【従来の技術】従来、壁面、ウインド面、掲示板、ロッカー、机、書架等の家具、その他の物品に、紙やフィルム等を付着するには、一般に、接着剤、粘着テープ、磁石などを利用している。これに対し、静電気付着力を利用して、各種物品に貼りつけ可能とした合成樹脂フィルムが提案されている。例えば、炭素数40～60の有機ケトンを配合して持続性静電付着力を付与したポリ塩化ビニルフィルム（特公昭63－30940号）、有機錫系安定剤を配合して持続性静電付着力を付与したポリ塩化ビニルフィルム（特開昭58－98351号）、プロピレン系樹脂と変性プロピレン系樹脂とからなる組成物を成膜してなるポリプロピレン系フィルム（特開昭61－251号）などが提案されている。

【0003】これらの合成樹脂フィルムは、持続性を有する静電気付着力が付与されているため、接着剤や、磁石等を使用することなく、各種物品に、繰返し貼りつけることができ、貼りつけ場所の変更も容易で、しかも貼りつけ面を汚すこともない。しかし、このような合成樹脂フィルムは接着剤や粘着テープ等の代替とはなるが、それ自体は記録適性を有していないので、ポスター等の被着体は、このような合成樹脂フィルムを所望の物品に付着させた上で、その上に付着させなければならない。またこれら従来の合成樹脂フィルムは、持続性静電付着力を付与するために特定の物質を配合しなければならないこと、30℃を超える温水に浸漬した場合に耐水白化現象を生じる場合があること等の問題があった。

【0004】また、絶縁材料、電極群及び表面の吸着用シートからなる物体保持装置の表層として、熱可塑性樹脂と合成ゴムを主成分とし、特定範囲の体積固有抵抗値を有するプラスチックシートを使用することが提案されている（特公昭55－20830号公報）。この物体保持機能を有するプラスチックシートによれば、電極に高

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圧電流を通電することにより吸着用シートに静電気を発生させ、その静電気により紙、フィルム、箔などを保持することができる。しかしながら、この物体保持装置は、電極を作製するのが煩雑であること、電源を必要とすること、持ち運びに不便であること等の問題があった。

【0005】これらの難点を解決するために本出願人は、図2に示すように、支持体20上に、静電荷帯電可能なポリマーからなる細孔質または多孔質の層10が形成されている静電吸着体30を提案した（特願平4－262823号）。

【0006】

【発明が解決しようとする課題】本発明者らが提案した、支持体20上に、静電荷帯電可能なポリマーからなる細孔質または多孔質の層10が形成されている静電吸着体30は、静電気吸着力を有し、各種物品に付着可能な、あるいは各種被着体を保持可能な静電吸着体として優れたものであるが、静電荷帯電可能なポリマーを溶剤に溶解し、支持体20である金属板、セラミックス板、紙、プラスチックフィルム等の上に塗布乾燥させる工程およびそれら基材が必要であった。

【0007】また、本発明者らが提案した、支持体20上に、静電荷帯電可能なポリマーからなる細孔質または多孔質の層10が形成されている静電吸着体30それ自体に、記録性を備えることが望まれていた。

【0008】

【目的】本発明は、上記の諸点に鑑みなされたもので、静電気吸着力を有して各種物品に付着可能な、あるいは紙やフィルム、シート等の被着体を保持可能な静電吸着体を提供することを目的とする。また、本発明は、記録性を兼ね備えた静電吸着体を提供することを目的とする。

【0009】

【課題を解決するための手段】このような目的を達成するため、本発明の静電吸着体は、静電荷帯電可能なポリマーからなる多孔質のフィルムまたはシートから成る。また、本発明の静電吸着体は、静電荷帯電可能なポリマーからなる多孔質の層と、多孔質の層上に積層された記録層とから成る。更に、本発明の静電吸着体は、支持体と、支持体の一方に積層された静電荷帯電可能なポリマーからなる多孔質の層と、支持体の他方に積層された記録層とから成るものである。

【0010】以下、本発明について詳述する。本発明の静電吸着体は、図1（a）に示すように、静電荷帯電可能なポリマーからなる多孔質の層1が成膜されたフィルムまたはシートであり、図1（b）に示すように、該静電荷帯電可能なポリマーからなる多孔質の層1の上に記録層4が積層されたフィルムまたはシートである。更に、図1（c）に示すように、支持体2の一方に静電荷帯電可能なポリマーからなる多孔質の層1が積層され、

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支持体２の他方に記録層４が積層されたフィルムまたはシートである。

【００１１】本発明で使用する静電荷帯電可能なポリマーとしては、特に限定されないが、具体例としては、アクリル樹脂、塩化ビニル・酢酸ビニル樹脂、塩化ビニル・酢酸ビニル・マレイン酸樹脂、スチレン・アクリル樹脂、アクリル・塩化ビニル樹脂、不飽和ポリエステル、塩化ゴム、酢酸ビニル樹脂、酢酸セルロース樹脂、エチルセルロース樹脂、フェノール樹脂、アクリロニトリル・塩化ビニリデン樹脂などを挙げることができる。

【００１２】本発明で使用する記録層４としては、特に限定されないが、①インクジェット記録適性を有する記録層、②熱溶融転写記録適性を有する記録層、③熱転写記録の１種で色素昇華記録適性を有する記録層等が好適である。

①インクジェット記録適性を有する記録層は、記録層側から記録されるインクを定着、保持する層であり、特に水－アルコール系や水溶性インクに対するインク吸収性及びインク発色性に優れた層であることが好ましい。このような記録層を形成する樹脂としては、例えばポリアミド、ポリアクリルアミド、ポリビニルピロリドン、ポリエチレンイミン、ポリビニルピリジリウムハライド、メラミン樹脂、ポリウレタン、カルボキシメチルセルロース、ヒドロキシエチルセルロース、ヒドロキシメチルセルロース、ポリビニルアルコール、ポリエステル、ポリアクリル酸ナトリウム等の親水性合成高分子やゼラチン、でんぷん、セルロース、カゼイン、キチン、キトサン等の親水性天然高分子、ポリエチレンオキサイドやその共重合体等の高吸水性樹脂が挙げられる。またこれら親水性樹脂に、（メタ）アクリル酸エステル共重合体のような親油性樹脂を適宜配合してもよい。これによりインクジェット用の記録用紙として必要な性能、例えばインク吸着性、耐水性、耐候性等を向上させることができる。

【００１３】また、溶剤としては、水、アルコール、エステル、ケトン等が用いられる。更に記録層はこれら樹脂中にマット化剤を添加してもよい。マット化剤としては、シリカ（非結晶性シリカ）、クレー、タルク、ケイソウ土、炭酸カルシウム、硫酸カルシウム、硫酸バリウム、珪酸アルミニウム、酸化チタン、酸化亜鉛、合成ゼオライト、アルミナ等の公知のマット化剤の他、スメクタイトを用いることができ、これらマット化剤は単独で或いは２種以上混合して用いることができる。マット化剤の添加量は、通常、樹脂１００重量部に対し５～２００重量部程度である。添加量が２００重量部を超えると、樹脂のバインディング能力がなくなってしまい好ましくない。記録層は、マット化剤の他、レベリング剤、紫外線吸収剤、酸化防止剤等の添加剤を添加することができる。

【００１４】②熱溶融転写記録適性を有する記録層は、

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インクが表面に転写され、耐摩耗性がある層で、このため、プリンターの発熱体、インクリボンとの密着性をよくするため平滑度が良好な層であることが好ましい。このような熱溶融転写記録適性を有する記録層を形成する樹脂としては、例えば、スチレンブタジエンラバー（ＳＢＲ）、酢酸ビニル樹脂、アクリル樹脂等が挙げられ、ベック平滑度が５０秒以上が好ましい。溶剤としては、ケトン、トルエン、シクロヘキサノン、アルコール等が用いられる。

【００１５】③色素昇華記録適性を有する記録層は、昇華性色素が染色しやすい表面の化学的、物理的構造の層であることが好ましい。このような色素昇華記録適性を有する記録層を形成する樹脂としては、例えば、ポリエステル樹脂、ポリビニルブチラール樹脂、ポリウレタン樹脂等が挙げられ、必要に応じてキレート化の利用多価金属イオンを含む金属錯体、離型剤、例えばシリコーン樹脂、シリコーンオイル、フッ素樹脂等を添加することができる。溶剤としては、ケトン、アセトン、トルエン、シクロヘキサノン等が用いられている。

【００１６】本発明で使用する支持体２としては、特に限定されないが、金属板、セラミック板、紙、プラスチックフィルム等が好適である。図１（ｃ）に示すような、支持体２の一方に静電荷帯電可能なポリマーからなる多孔質の層１が形成され、支持体２の他方に記録層４が形成された静電吸着体３２は、以下のように製造される。

【００１７】上述の静電荷帯電可能なポリマーを溶剤に溶解し、上述の素材内から選ばれた支持体２の一方に塗布・乾燥させる。多孔質の層を形成するには、溶剤としてポリマーに対する良溶剤と貧溶剤を組合せて使用する。良溶剤と貧溶剤の比率を変化させて孔径を変えることができる。多孔質の層は、膜の表面に開放孔を有し、膜の厚さ方向には連続気泡あるいは部分的な連続気泡が形成されており、直径約５μm以下の目の細かい孔を有する塗膜、いわゆる微細孔膜とすることができる。また、直径約５～１００μmの目の粗い開放孔を有する塗膜、いわゆるブラッシング膜であってもよい。ブラッシング膜は、ポリマー溶液を塗布後、６０～８０％程度の湿度雰囲気中で乾燥させることにより形成することができ、通常、表層より気泡が５個前後の連続気泡となる。

【００１８】静電荷帯電可能なポリマーからなる層をブラッシング膜または微細孔質膜とすることにより、従来の表面平滑な均一の塗膜（ソリッド膜）とした場合と比較して、帯電性の効果が著しく改善される。摩擦帯電量の観点から、特に、微細孔質膜とすることが好ましい。更に、支持体２の他方に記録層４として例えばインクジェット記録適性を有する記録層を積層するには、上述の樹脂を単独或いは混合した物及び必要な添加剤を適当な溶剤に溶解又は分散させて塗工液を調整し、例えばロールコーティング法、バーコーティング法、エアナイフコ

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ーティング法、スプレーコーティング法など公知の方法により支持体2の他方上に塗布・乾燥させる。溶剤としては、プロピレングリコールモノメチルエーテル、メチレングリコールモノメチルエーテル、エチルアルコール、メチルアルコール、イソプロピルアルコール等の有機溶剤や水が用いられる。

【0019】図1（a）に示すように、静電荷帯電可能なポリマーからなる層1をフィルムまたはシートとするには、種々の方法があるが、例えば、①静電荷帯電可能なポリマーに対して離型性のあるポリエステル、ポリカーボネート等のプラスチックフィルムや合成紙（図示せず）上に、静電荷帯電可能なポリマー溶解液を塗布・乾燥させて多孔質の層を形成した後、プラスチックフィルムまたは合成紙を剥離除去して形成される。また、②母材となる静電荷帯電可能なポリマー中に、該ポリマーと非相溶の公知の多孔質発泡フィルム用ポリマーを細かく均一に分散させたものをシート化して延伸することにより形成してもよく、非相溶の公知の多孔質発泡フィルム用ポリマーとしては、ポリー3－メチルブテン－1、ポリスチレン、ポリメチルスチレン等から選択された高融点のポリマー、例えばポリエステル母材に対して、ポリオレフィン、特にポリメチルペンテンが好適である。

【0020】図1（b）に示すような、静電荷帯電可能なポリマーからなる多孔質の層1上に、記録層4が形成された静電吸着体31は、例えば、上述の①と同様に、静電荷帯電可能なポリマーに対して離型性のあるポリエステル、ポリカーボネート等のプラスチックフィルムや合成紙（図示せず）上に、静電荷帯電可能なポリマー溶解液を塗布・乾燥させて多孔質の相を形成した後、この多孔質相上に、上述したいずれかの記録適性を有する記録層4を設け、プラスチックフィルムあるいは合成紙を剥離除去して形成される。また、上述の②で形成された静電荷帯電可能なポリマーからなる層1の上に、上述したいずれかの記録適性を有する記録層4用塗工液を調整し、塗布・乾燥させることにより形成してもよい。尚、静電荷帯電可能なポリマーからなる層1のポリマーと記録層4を形成するポリマーは、互に非相溶のものから選択される。

【0021】静電荷帯電可能なポリマーからなる層1の厚さは、特に限定されないが、摩擦に対する機械的な強度、繰返し使用に耐え得る等の点から、通常25μmから250μmの範囲が好適である。支持体2の厚さは、特に限定されないが、静電吸着体として必要な厚さ（例えば、6～188μm）を備え、また本発明の静電吸着体を被着体に付着させるにあたり、例えば自動車のフロントガラス、円柱等の曲面に付着する場合には、支持体として可撓性のあるものや厚みの薄いプラスチックフィルム等を使用することが好ましく、一般に、被着体の面の形状、粗さも考慮し、被着体との密着性を付与可能な可撓性のある厚さが適宜選択される。

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【0022】記録層4の厚さは、特に限定されないが、摩擦に対する機械的な強度、繰返し使用に耐え得る等の点から、通常0．1～50μm程度、好適には1～20μm程度である。本発明の図1（a）に示す静電吸着体3は、優れた静電気付着力を有した両面テープとしての機能を有しているため、ロッカー、窓ガラス、壁などに数回擦り合わせただけで、目的の被着体に付着し、メモ用紙、伝言・広告などの用紙、掲示板、白板等の表面材を所望位置に貼付でき、かつ、付着状態を長期にわたって維持することができる。

【0023】また、本発明の静電吸着体は、物体の静電保持装置としても使用することができる。この場合、被着体となる物質は、通常、紙やプラスチックシート、プラスチックフィルムなどである。例えば、自動製図機のフラットベット等の台上に、紙、トレーシングフィルム、カッティングシート等のメディアを載置して保持し、描画あるいはカッティングなどの各種作業を行う場合、本発明の静電吸着体をそれらの台上に載置しておけば、これらのメディアを摩擦帯電により容易に静電吸着体の吸着面に平面性良く保持させることができる。用紙の位置決め、位置の変更も容易で、用紙の端部は持ち上がらず、しかも、フラットベットに密着し平面性も良好であることから、作図の作業性が向上し、精度の良い描画ができる。

【0024】静電吸着層の摩擦帯電量（表面電荷）は、摩擦する対象により異なるが、＋0．9kV以上または－0．9kV以下であることが好ましく、特に＋1．1kV以上または－1．1kV以下であることが好ましい。これによりガラス、樹脂塗工面など通常の物品表面に数回の擦り合わせによって容易に付着させることができ、したも長期に付着力を保持できる。本発明の静電吸着体は、上記ポリマーを用いるとともに層の構造を多孔質とすることにより、ＰＰＣ用紙、（コピー用紙）、トレーシングフィルム、カッティングシート等と摩擦させた場合に、大きな摩擦帯電量を得ることができる。

【0025】本発明の静電吸着体を摩擦帯電により被着体に密着保持させると、初期の保持力は経時的に上昇し一定の値になる。これは、静電吸着体と被着体との間に距離が短くなると共に均一になり、コンデンサー状態が形成されて吸着面に帯電した電荷が逃げ難くなるためと考えられる。従って、本発明の静電吸着体を壁やロッカー等の平面的な物品の表面に付着する用途に使用する場合には、どのような支持体でも問題はない。

【0026】本発明の図1（b）に示す静電吸着体31および図1（c）に示す支持体4を介在させた本発明の静電吸着体32は、優れた静電気付着力を有すと共に、記録層4を備えているため、予めこの記録層4に記録をしてから、目的の被着体に容易に付着でき、あるいは、付着させた後に記録層4に記録も可能で、かつ、被着体に対する良好な付着状態を長期にわたって維持すること

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ができる。

【0027】

【実施例】以下、本発明の実施例を説明する。

「実施例1」ポリエステルフィルム（Q81：東レ社製）上に、下記の多孔質層用塗工液をメイヤーバーにて塗布し、乾燥機にて60°Cで5分間乾燥させ、膜厚が30μmで平均2μmの開放孔を有する多孔質の層を形成した。その後、得られた塗工フィルムからポリエステルフィルムを剥離し、本発明の静電吸着体を得た。

【0028】本発明の静電吸着体をガラス窓、壁（塗料を吹きつけた表面の粗い面）、及び冷蔵庫の側面に、それぞれ数回擦り合わせて密着させた後、複写されたPPC用紙、ポスター等を静電吸着体に数回擦り合わせて密着させて放置した。その結果、6ヵ月を経過した後も静電吸着体が被着面に付着しかつ複写されたPPC用紙、ポスター等も脱落しなかった。

【0029】・多孔質層用塗工液

ニトロセルロース	10重量部
（HIG1／2：旭化成工業社製）	
アセトン	67．5重量部
メチルエチルケト	22．5重量部

「実施例2」ポリエステルフィルム（Q81：東レ社製）上に、実施例1と同様の多孔質層用塗工液をメイヤーバーにて塗布し、乾燥機にて60°Cで5分間乾燥させ、膜厚が8μmで平均2μmの開放孔を有する多孔質の層を形成した。得られた塗工フィルムの多孔質層面を自動車のフロントガラスに対向させて重ね、数回擦り合わせて密着させた後、ポリエステルフィルムのみを剥離し、フロントガラス上に本発明の静電吸着体を形成した。その結果、1ヵ月を経過した後も、静電吸着体が被着面から脱落しなかった。また薄い静電吸着体を使用したことから曲面にも追従して密着させることができた。

【0030】「実施例3」厚さ75μmのポリエステルフィルムの片面に、下記の多孔質層用塗工液を塗工し、湿度を80％に保った乾燥機にて60°Cで10分間乾燥させ、気泡の径が約30μmのブラッシングさせた多孔質層を形成した。更にこの層上に下記の記録層用塗布液をバーコーターで塗布し、乾燥膜厚が10μmの記録層を形成した。得られた記録材料の記録層面にインクジェットプリンターで印字した後、ポリエステルフィルムを剥離し、本発明の静電吸着体を得た。

【0031】静電吸着体をガラス窓、壁（塗料を吹きつけた表面の粗い面）、及び冷蔵庫の側面に向け、それぞれ数回擦り合わせて密着させた。その結果6ヵ月を経過した後も、被着面に付着していた。

・多孔質層用塗布液

スチレン・アクリル樹脂	5重量部
（EMUパウダー：BASF社製）	
アセトン	45重量部
エタノール	50重量部

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・記録層用塗布液

PVP（PVPK－90：ISP社製）	3重量部
（メタ）アクリル酸エステル共重合体	2重量部
メチルセロソルブ	45重量部

「実施例4」厚さ75μmのポリエステルフィルムの片面に、実施例3と同様に、気泡の径が約30μmのブラッシングさせた多孔質層を形成した。更に、この層上に下記の記録層用塗布液をバーコーターで塗布し、乾燥膜厚が5μmの記録層を形成した。得られた記録材料の記録層面に昇華転写プリンターで印字した後、ポリエステルフィルムを剥離し、本発明の静電吸着体を得た。

【0032】この静電吸着体を、ガラス窓、壁（塗料を吹きつけた表面の粗い面）、及び冷蔵庫の側面に向け、それぞれ数回擦り合せて密着させた。その結果6ヵ月を経過した後も、被着面に付着していた。

・記録層用塗布液

酢酸ビニル樹脂	10重量部
（ゴーセニールPV－500：日本合成化学工業社製）	
トルエン	40重量部

「実施例5」厚さ75μmのポリエステルフィルムの片面に、実施例3と同様に、気泡の径が約30μmのブラッシングさせた多孔質層を形成した。更に、この層上に下記の記録層用塗布液をバーコーターで塗布し、乾燥膜厚が10μmの記録層を形成した。得られた記録材料の記録層面に熱溶融転写プリンターで印字した後、ポリエステルフィルムを剥離し、本発明の静電吸着体を得た。

【0033】この静電吸着体を、ガラス窓、壁（塗料を吹きつけた表面の粗い面）、及び冷蔵庫の側面に向け、それぞれ数回擦り合せて密着させた。その結果6ヵ月を経過した後も、被着面に付着していた。

・記録層用塗布液

不飽和ポリエステル樹脂	10重量部
（バイロン200：東洋紡績社製）	
メチルエチルケトン	30重量部
トルエン	30重量部
シクロヘキサノン	30重量部

「実施例6」厚さ75μmのポリエステルフィルムの片面に、下記の記録層用塗布液をバーコーターで膜厚10μmになるよう塗布、乾燥し記録層を形成した。この記録層と反対面に、下記の多孔質層用塗工液をメイヤーバーにて塗布した後、乾燥機にて60°Cで5分間乾燥させ、膜厚8μmで平均0．8μmの開放孔を有する多孔質の層を形成し本発明の静電吸着体を得た。

【0034】本発明の静電吸着体の記録層面にインクジェットプリンターで印字した後、多孔質層側をガラス窓、壁（塗料を吹きつけた表面の粗い面）、及び冷蔵庫の側面に向け、それぞれ数回擦り合せて密着させた。その結果6ヵ月を経過した後も、被着面に付着していた。

・記録層用塗布液

PVP（PVPK－90：ISP社製）	3重量部

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（メタ）アクリル酸エステル共重合体　　2重量部
メチルセロソルブ　　45重量部
・多孔質層用塗布液
塩化ビニル・酢酸ビニル樹脂　　10重量部
（400×150S：日本ゼオン社製）
メチルエチルケトン　　65重量部
n－ブタノール　　25重量部

「実施例7」厚さ50μmのポリエステルフィルムの片面に、下記の記録層用塗布液をバーコーターで膜厚5μmになるよう塗布、乾燥し記録層を形成した。更に、この記録層と反対面に、実施例6と同様な多孔質層を形成し本発明の静電吸着体を得た。

【0035】本発明の静電吸着体の記録層面に熱溶融転写プリンターで印字した後、多孔質層側をガラス窓、壁（塗料を吹きつけた表面の粗い面）、及び冷蔵庫の側面に向け、それぞれ数回擦り合わせて密着させた。その結果6ヵ月を経過した後も、被着面に付着していた。

・記録層用塗布液
酢酸ビニル樹脂　　10重量部
（ゴーセニールPV－500：日本合成化学工業社製）
トルエン　　40重量部

「実施例8」厚さ100μmのポリエステルフィルムの片面に、下記の記録層用塗布液をバーコーターで膜厚10μmになるよう塗布、乾燥し記録層を得た。更に、この記録層と反対面に、実施例6と同様な多孔質層を形成し本発明の静電吸着体を得た。

【0036】本発明の静電吸着体の記録層に昇華転写プリンターで印字した後、静電吸着層をガラス窓、壁（塗料を吹きつけた表面の粗い面）、及び冷蔵庫の側面に向け、それぞれ数回擦り合せて密着させた。その結果6ヵ

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月を経過した後も、被着面に付着していた。

・記録層用塗布液
不飽和ポリエステル樹脂　　10重量部
（バイロン200：東洋紡績社製）
メチルエチルケトン　　30重量部
トルエン　　30重量部
シクロヘキサノン　　30重量部

以上の実施例から明らかなように、ブラッシング膜または微細孔質膜を静電吸着体として有する本発明の静電吸着体が優れた摩擦帯電特性を示すとともに、記録層を備えているので、印刷物の貼付、掲示にも好適である。

【0037】

【発明の効果】以上の実施例からも明らかなように、本発明によれば、静電荷帯電可能なポリマーからなる多孔質の層を形成することにより、優れた摩擦帯電特性を有する静電吸着体が提供される。本発明の静電吸着体には記録層が積層されているので、本発明の静電吸着体に直接印刷して掲示等に使用できる。更に、本発明の静電吸着体は支持体を介して記録層が積層されているので、強度的にも優れた静電吸着体を得ることができる。

【図面の簡単な説明】

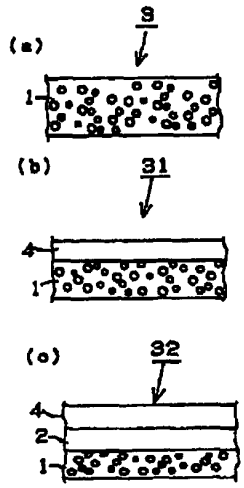
【図1】（a）、（b）、（c）とも本発明の静電吸着体の断面図である。

【図2】従来の静電吸着体の断面図である。

【符号の説明】

1……静電荷帯電可能なポリマー層
2…支持体
3、31、32…静電吸着体
4…記録層

【図1】



【図2】